Distribution and Abundance of Larval Sablefish *(Anoplopoma fimbria)* in the Surface Waters off the West Coast of Vancouver Island, April 9-24, 1985

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June 1987

Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 1945

Fisheries and Oceans Pêches et Océans

Canada

88-02190/

Canadian Manuscript Report of Fisheries and Aquatic Sciences

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Canadian Manuscript Report of
Fisheries and Aquatic Sciences No. 1945

June 1987

DISTRIBUTION AND ABUNDANCE OF LARVAL SABLEFISH (*Anoplopoma fimbria*) IN THE SURFACE WATERS OFF THE WEST COAST OF VANCOUVER ISLAND, APRIL 9-24, 1985

by

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Cat. No. Fs 97-4/1945E ISSN 0706-6473

Correct citation for this publication:

Shaw, W., G. A. McFarlane, and D. Davenport. 1987. Distribution and abundance of larval sablefish (Anoplopoma fimbria) in the surface waters off the west coast of Vancouver Island, April 9-24, 1985. Can. MS Rep. Fish. Aquat. Sci. 1945: 49 p.

ABSTRACT

Shaw, W., G. A. McFarlane, and D. Davenport. 1987. Distribution and abundance of larval sablefish (Anoplopoma fimbria) in the surface waters off the west coast of Vancouver Island, April 9-24, 1985. Can. MS Rep. Fish. Aquat. Sci. 1945: 49 p.

The surface distribution and abundance of larval sablefish was examined using a neuston net off Vancouver Island from April 9 to 24, 1985. A total of 61 stations was fished at night of which 17 were repeated during daylight hours. Sablefish larvae were caught at 46 stations for a total of 823 larvae. They composed 10.9% of the total catch of larvae and occurred at 68.9% of the stations sampled at night. Their relative abundance increased at stations seaward of the 200 m isobath. Relative abundance estimates from night tows ranged from 0 to 262.9 larvae per 1000 m^3 and from 0 to 15.1 larvae per 1000 m^3 for day tows. Sablefish larvae were most abundant off Barkley Sound, averaging 38.4 larvae per 1000 m^3 per station. Sablefish larvae ranged in length from 6 to 34 mm and averaged 14.9 mm (SE=0.69). Ninety-five percent ranged in length from 9 to 20 mm.

Other larval species caught during this survey are also discussed in this report.

Key words: Sablefish larvae, distribution, abundance, neuston net, Vancouver Island

RESUME

Shaw, W., G. A. McFarlane, and D. Davenport. 1987. Distribution and abundance of larval sablefish (Anoplopoma fimbria) in the surface waters off the west coast of Vancouver Island, April 9-24, 1985. Can. MS Rep. Fish. Aquat. Sci. 1945: 49 p.

La distribution et l'abondance à la surface des larves de morue charbonnière ont été examinées, au moyen d'un filet à neuston, au large de l'île de Vancouver, du 9 au 24 avril 1985. Des échantillons ont été prélevés de nuit à 61 stations, et l'échantillonnage a été répété de jour à 17 d'entre elles. Des larves de la morue charbonnière ont été capturées à 46 stations, pour un nombre total de larves de 823. Ces larves constituaient 10,9% des larves capturées et étaient présentes dans les échantillons prélevés la nuit à 68,9% des stations. On a observé une abondance relative supérieure de ces larves aux stations situées au large de l'isobathe de 200 m. Les estimations de l'abondance relative varient de 0 à 262,9 larves au 1 000 m^3 pour les échantillonnages de nuit et de 0 à 15,1 larves au 1 000 m^3 pour ceux de jour. Les larves de la morue charbonnière étaient plus abondantes au large du détroit de Barkley où l'on en a prélevé en moyenne par station 38,4 au 1 000 m^3. Les larves échantillonnées de morue charbonnière mesuraient entre 6 et 34 mm, pour une moyenne de 14,9 mm (erreur-type: 0,69). Quatre-vingt-quinze pour cent d'entre elles mesuraient entre 9 et 20 mm.

On traite également dans le rapport des larves d'autres espèces qui ont été capturées au cours de l'étude.

Mots-clés: Larves de morue charbonnière, distribution, abondance, filet à neuston, île de Vancouver

INTRODUCTION

A larval survey of the surface waters off the west coast of Vancouver Island was conducted during April 9 to 24, 1985. This report describes the second in a series of surveys for larval sablefish off the west coast of Vancouver Island. A report describing the 1984 survey (Shaw et al. 1985) has already been produced. These surveys are part of a multidisciplinary study being conducted on the La Pérouse Bank. They are designed to determine the relative abundance and distribution of sablefish (Anoplopoma fimbria) larvae occupying the surface waters off Vancouver Island.

This report presents the results of this survey. Preliminary information on distribution and relative abundance of other species is also presented.

MATERIALS AND METHODS

The R/V G.B. REED was used for the larval survey. The survey area extended from Kyuquot Sound to Pachena Point for a total of six tracklines (Fig. 1). The position of the tracklines and stations off Kyuquot Sound, Nootka Sound and off Pachena Point (1984 southern Barkley Sound transect), during this survey, were identical to those occupied during the larval survey conducted in 1984 (Shaw et al. 1985). The position of the Clayoquot Sound trackline is similar to that presented in the 1984 survey. Two additional tracklines have been incorporated for this survey between Pachena Point and Clayoquot Sound. They are the Wickaninnish Bay trackline, which replaces the 1984 northern Barkley Sound trackline, and the new Barkley Sound trackline. These tracklines will help to refine the distribution of larvae on La Pérouse Bank. Tracklines ranged from 27 to 67 km apart and stations on a trackline ranged from 2 to 38 km apart. Stations on a trackline extended from 4 to 190 km offshore and covered a north-south distance of 228 km. Additional stations were selected in the vicinity of the tracklines for collecting additional information on sablefish larvae, and for conducting vertical plankton hauls.

The neuston sampler and sampling strategy at sea is the same as described in the 1984 survey by Shaw et al. (1985). In brief the neuston sampler is a modification of the Sameoto samplers (Sameoto and Jaroszynski 1969) and is fully described by Mason and Phillips (1986). A General Oceanics center-mounted flow-meter was bolted to the mouth of the frame of the sampler. Upon arrival at a station, two 10-minute tows were normally conducted. Some stations were reoccupied again at night later in the survey. All stations were fished at night. To investigate differences in night-day abundance and distribution of sablefish larvae, selected stations were reoccupied during daylight. All samples collected at sea were preserved in a five percent seawater formaldehyde solution.

In the laboratory, all sablefish were measured for length (mm); either to fork length for larger larvae or total length for the smaller larvae if the fork could not be identified. All measurements in this report are referred to as fork length. The procedure for calculating the relative abundance estimates for this report is outlined in Shaw et al. (1985).

In addition to the regular 10 minute tows, "short" 3- to 5-minute tows were conducted between stations already selected on a trackline. From these tows live sablefish larvae were collected, retained on board in small aquariums and transported to the Pacific Biological Station, as part of the study to investigate growth of larval sablefish. Data from these "short" tows were not included in the relative abundance calculations or the distribution maps, however, they were included in the length frequency examination.

Relative abundance estimates were calculated for Pacific herring (Clupea harengus pallasi), lingcod (Ophiodon elongatus), and Pacific sand lance (Ammodytes hexapterus). Other larval fish in the catch were identified to the lowest possible taxon and enumerated by station. All larvae and eggs were preserved in 70 percent isopropanol.

Expendable bathythermograph (XBT) casts were taken at most of the stations corresponding to neuston tow and vertical haul station. Additional casts were made between selected neuston stations located on 4 tracklines (Clayoquot Sound to Pachena Point inclusive) in order to increase the resolution of the seawater temperatures. All data were summarized by standard depths (0, 10, 20, 30, 50, 75, 100, 150, 200, 250, 300, 400, 500, 600, and 700 m).

Vertical plankton hauls from a depth of 200 m to the surface were made at standardized stations using a six meter SCOR net equipped with a 350 µm nitex mesh net. The mesh size in the codend was also the same as in the net. The samples were preserved in 10% formalin for later identification in the laboratory.

RESULTS

SURVEY OVERVIEW

A total of 61 stations was fished during the survey (Fig. 1). All 61 stations were fished at night and 17 were reoccupied during daylight. Forty-seven stations were positioned on six tracklines (Kyuquot Sound, Nootka Sound, Clayoquot Sound, Wickaninnish Bay, Barkley Sound, and Pachena Point) and the remaining 14 stations were positioned between tracklines.

Set locations of each tow are presented in Appendix table 1. A list of the common and scientific names of larval fish collected during the survey is presented in Table 1. A total of 7429 larval fish was collected from night tows and 1274 from day tows (Table 2). Only 45 larvae from the night tows and

56 larvae from the day tows could not be identified. The most abundant larval fish species caught in the night tows were Irish lord (sp.) (Hemilepidotus sp.) (23.5%), greenling (sp.) (Hexagrammidae) (19.2%), and sablefish (10.9%), similar to the 1984 survey (Shaw et al. 1985). The most abundant species caught in the day tows were Pacific herring (45.5%), greenling (sp.) (18.1%), and Pacific sand lance (13.4%). The most common larval fish caught in the night tows were greenling (sp.) (85.2%), Irish lord (sp.) (78.7%), and sablefish at 68.9% of the stations sampled (Table 3). The larval fish most frequently caught in the day tows were greenling (sp.) (94.1%), sablefish (47.1%) and lingcod at 47.1 percent of the stations sampled.

Expendable bathythermograph (XBT) casts were made at 65 stations. Forty-seven of those stations corresponded as neuston stations (Table 4; Fig. 2). Vertical plankton hauls were conducted at 11 stations near the Barkley Sound and Pachena Point tracklines (Appendix table 2; Fig. 2).

SABLEFISH

Sablefish larvae were distributed throughout surface waters of the survey area. A total of 823 larvae were caught at 46 stations (Fig. 3) and composed 10.9% of the total catch of larvae (Table 2). Almost all of the larvae (98%) were caught in the night tows. An additional 1435 sablefish larvae were caught and preserved from the "short" 3-5 minute tows conducted between stations on the Clayoquot Sound, Barkley Sound and Pachena Point tracklines. Relatively large catches of sablefish larvae (excluding "short" tows) were made on the Clayoquot Sound, Barkley Sound, and Pachena Point tracklines (Table 5).

Relative abundance estimates from single tows at night ranged from 0 to 262.9 larvae per 1000 m^3 (Appendix table 3). Stations having the highest relative abundance estimate (>101 larvae per 1000 m^3) from night tows were no. 37 (111.8 larvae per 1000 m^3), no. 21 (106.0 larvae per 1000 m^3), and nos. 53 and 54 (131.4 and 116.9 larvae per 1000 m^3, respectively). Estimates of larval sablefish abundance from single tows during the day ranged from 0 to 15.1 larvae per 1000 m^3. Stations having the highest abundance estimates for day tows were nos. 13 and 39 (both at 14.7 larvae per 1000 m^3). The abundance estimates of sablefish larvae caught during the night increased seaward of the 200 m isobath, and towards the 2000 m isobath for sablefish larvae caught during the day.

The length frequency information collected from the "short" tows is included to describe the overall size composition of sablefish larvae in this survey. Sablefish larvae ranged in length from 6 to 34 mm with a mean length of 14.9 mm (SE = 0.69) (Table 6; Fig. 4). Most of the larvae (95%) ranged from 9 to 20 mm. The mean lengths of larvae from all of the tows by tracklines were 14.6 mm off Pachena Point, 15.2 mm off Barkley Sound, 16.5 mm off Wickaninnish Bay, 17.6 mm off Clayoquot Sound, 16.7 mm off Nootka Sound and 15.7 mm off Kyuquot Sound (Table 6).

The mean lengths of larvae in this survey are slightly smaller as compared to last year's results (Shaw et al. 1985). In 1984 the majority of the sablefish larvae were caught later in April than in 1985 which could explain the difference in the mean lengths.

OTHER FISH LARVAE

Pacific herring larvae were not common in the catches and were found at only 6 stations on the Kyuquot Sound, Clayoquot Sound and Pachena Point tracklines (Appendix table 4; Fig. 5). These stations were located relatively close to the shoreline except for off Kyuquot Sound where the largest catch of herring larvae (Stn. 45) was 41 km (22 nm) offshore. A total of 1061 herring larvae was caught in the neuston tows which constituted 12.2% of the total catch of larvae (Table 2). Most of the herring larvae (54.7%) were caught in the day tows. Pacific herring larvae were the most abundant larvae in the day tows composing 45.5% of the total day catch of larvae. During the 1984 survey no herring were caught in day tows. The largest catches of herring were made at Stn. 45 for 475 larvae (44.8%), and at Stn. 30 for 337 larvae (31.8%). Relative abundance estimates of Pacific herring from the night tows ranged from 0 to 1220.9 and from 0 to 2564.3 larvae per 1000 m^3 from day tows (Appendix table 4).

Lingcod larvae were distributed throughout the survey area and were caught at 29 stations (47.5%) (Appendix table 4; Fig. 5). A total of 651 larvae were caught composing 7.5% of the total catch of larvae (Table 2). Most of the larvae (79.0%) were caught in the night tows. They constituted 6.9% of the total catch of larvae from the night tows and 10.8% from the day tows. The largest catches were made off Kyuquot Sound, at Stn. 43 for 57 and 59 larvae. Lingcod larvae were very common in the catches at stations on the Pachena Point trackline. Relative abundance estimates of lingcod from the night tows ranged from 0 to 358.4 larvae per 1000 m^3 and from 0 to 195.2 larvae per 1000 m^3 for the day tows (Appendix table 4). These estimates are almost three times higher than the estimates from the 1984 survey (Shaw et al. 1985).

Pacific sand lance larvae were distributed throughout the survey and were caught at 23 stations (37.7%) (Appendix table 4; Fig. 6). A total of 797 larvae were caught composing 9.2% of the total catch of larvae (Table 2). Most of the larvae (78.5%) were caught in the night tows. They constituted 8.4% and 13.4% of the total catch of larvae from night and day tows respectively. Large catches were made off Kyuquot Sound at Stn. 43 (night tow) for 429 larvae, and at Stn. 45 (day tow) for 113 larvae. Pacific sand lance larvae were common in the catches at stations along the Pachena Point trackline. Relative abundance estimates of Pacific sand lance from the night tows ranged from 0 to 2620.6 larvae per 1000 m^3 and from 0 to 501.3 larvae per 1000 m^3 from the day tows.

Catches of other larvae representing 18 different taxa are presented in Appendix table 5. Irish lord (sp.) larvae were the most abundant larvae collected during the survey with 53.0% caught along the Pachena Point trackline and 28.0% along the Barkley Sound trackline. Only one rockfish (Sebastes sp.) larva and seven lemon sole (Parophrys vetulus) larvae were caught in the neuston tows.

Fish eggs were common and occurred at 50.8% of the stations.

SEA TEMPERATURE PROFILES

A summary of the sea temperature profiles by depth interval is given in Table 4. Sea surface temperatures ranged from 8.2 to 9.5°C and averaged 8.8°C (SE = 0.034). Sea surface temperatures during this survey averaged about 0.9°C cooler than those reported by Shaw et al. (1985) during the 1984 survey.

ACKNOWLEDGMENTS

The authors would like to thank Mark Saunders for kindly reviewing the manuscript and Roberta Patterson and Diane Hansen for sorting, counting and assisting in the identification of all of the larvae.

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Table 1. Common and scientific names of larval fish captured in the neuston tows. R/V G.B. REED, April 9-24, 1985.

Common name	Scientific name
Sablefish	*Anoplopoma fimbria*
Irish lord (sp.)	*Hemilepidotus* sp.
Greenling (sp.)	Hexagrammidae
Pacific sand lance	*Ammodytes hexapterus*
Sculpin (sp.)	Cottidae
Lingcod	*Ophiodon elongatus*
Dwarf wrymouth	*Lyconectes aleutensis*
Pacific herring	*Clupea harengus pallasi*
Blue lanternfish	*Tarletonbeania crenularis*
Snailfish (sp.)	Cyclopteridae
Smelt (sp.)	Osmeridae
Gunnell (sp.)	Pholidae
Prickleback (sp.)	Stichaeidae
Lemon sole	*Parophrys vetulus*
Graveldiver	*Scytalina cerdale*
Wolf-eel	*Anarrhichthys ocellatus*
Poacher (sp.)	Agonidae
Cabezon	*Scorpaenichthys marmoratus*
Rockfish (sp.)	*Sebastes* sp.
Sanddab (sp.)	Bothidae
Sand sole	*Psettichthys melanostictus*
Walleye pollock	*Theragra chalcogramma*

Table 2. Larval fish collected in the neuston tows ranked in order of numerical abundance. R/V G.B. REED, April 9-24, 1985.

Larvae	Total			
	Number		Percent	
	Night	Day	Night	Day
Irish lord (sp.)	1744	15	23.5	1.2
Greenling (sp.)	1424	230	19.2	18.1
Sablefish	807 (1435)[a]	16	10.9 (19.3)[a]	1.3
Pacific sand lance	626	171	8.4	13.4
Sculpin (sp.)	620	42	8.3	3.3
Lingcod	514	137	6.9	10.8
Dwarf wrymouth	494	15	6.7	1.2
Pacific herring	481	580	6.5	45.5
Blue lanternfish	461	0	6.2	0
Snailfish (sp.)	98	0	1.3	0
Smelt (sp.)	42	7	0.6	0.6
Gunnel (sp.)	33	0	0.4	0
Prickleback (sp.)	21	1	0.3	0.1
Lemon sole	7	0	0.1	0
Graveldiver	3	0	0.04	0
Wolf-eel	3	0	0.04	0
Poacher (sp.)	2	0	0.03	0
Cabezon	1	0	0.01	0
Rockfish (sp.)	1	0	0.01	0
Sanddab (sp.)	1	0	0.01	0
Sand sole	1	3	0.01	0.2
Walleye pollock	0	1	0	0.1
Unidentified larvae	45	56	0.6	4.4
Total	7429(1435)[a]	1274		
Unidentified eggs	6283	342		

[a]Total (in parenthesis) represents sablefish collected only from the short 3-5 minute tows between stations.

Table 3. Rank abundance of larvae occurring in the stations sampled. R/V G.B. REED, April 9-24, 1985.

Larvae	Number of stations		Percent occurrence	
	Night	Day	Night	Day
Greenling (sp.)	52	16	85.2	94.1
Irish lord (sp.)	48	5	78.7	29.4
Sablefish	42	8	68.9	47.1
Dwarf wrymouth	35	4	57.4	23.5
Lingcod	29	8	47.5	47.1
Sculpin (sp.)	29	7	47.5	11.5
Pacific sand lance	20	6	32.8	35.3
Blue lanternfish	18	0	29.5	0
Snailfish (sp.)	18	0	29.5	0
Prickleback (sp.)	11	0	18.0	0
Smelt (sp.)	6	2	9.8	11.8
Pacific herring	4	2	6.6	11.8
Lemon sole	3	0	4.9	0
Graveldiver	2	0	3.3	0
Poacher (sp.)	2	0	3.3	0
Wolf-eel	2	0	3.3	0
Gunnel (sp.)	2	0	3.3	0
Cabezon	1	0	1.6	0
Rockfish (sp.)	1	0	1.6	0
Sanddab (sp.)	1	0	1.6	0
Sand sole	1	1	1.6	5.9
Walleye pollock	0	1	0	5.9
Unidentified larvae	8	6	13.1	35.3
Unidentified eggs	47	16	77.1	94.1

Table 4. Temperatures (°C) determined from expendable bathythermograph (XBT) readings taken at designated oceanographic stations. R/V G.B. REED, April 9-24, 1985.

Stn. no	Day/ month	Time (PDT)	Lat.	Long.	Standard depths (m)														Bottom	
					0	10	20	30	50	75	100	150	200	250	300	400	500	600	700	°C	(m)
1	10/4	0556	48°40.4	124°59.5	9.2	9.2	8.0	7.2	-	-	-	-	-	-	-	-	-	-	-	8.0	31
2		0609	48°39.0	125°02.4	9.1	8.7	8.1	7.8	7.8	-	-	-	-	-	-	-	-	-	-	7.7	53
3		0706	48°37.3	125°05.6	9.0	8.5	8.0	7.9	7.7	7.6	-	-	-	-	-	-	-	-	-	7.5	91
4		0722	48°35.7	125°08.7	9.5	8.5	8.0	7.9	7.6	7.5	7.3	-	-	-	-	-	-	-	-	7.2	112
5		0830	48°34.0	125°12.0	9.5	8.5	7.9	7.9	7.7	7.7	7.3	-	-	-	-	-	-	-	-	7.2	101
6		0845	48°32.2	125°15.5	9.5	9.4	8.3	8.0	7.8	7.8	7.4	-	-	-	-	-	-	-	-	7.1	113
7		1010	48°28.6	125°22.1	8.8	8.4	8.2	8.2	8.1	7.6	7.5	6.9	-	-	-	-	-	-	-	7.0	157
8		2256	48°25.3	125°28.6	8.8	8.7	8.4	8.1	8.3	8.1	7.6	-	-	-	-	-	-	-	-	7.0	141
9	11/4	0109	48°22.0	125°34.8	8.5	8.5	7.9	7.8	7.7	7.6	7.6	-	-	-	-	-	-	-	-	6.7	151
10		0247	48°18.6	125°41.4	9.0	9.1	9.1	8.3	8.1	8.0	7.7	7.0	-	-	-	-	-	-	-	7.0	154
11		0433	48°15.2	125°47.8	8.5	8.7	8.5	8.3	8.2	8.2	8.1	7.7	7.0	-	-	-	-	-	-	6.8	216
12		0620	48°12.9	125°51.9	8.9	8.9	8.7	8.1	8.4	8.4	8.1	7.4	6.7	6.2	6.2	5.5	5.4	-	-	5.0	534
13		0652	48°10.0	125°56.1	8.9	8.8	8.7	8.7	8.3	8.3	8.0	7.2	6.9	6.5	5.9	5.4	5.1	4.6	4.4	4.0	951
14		0829	48°08.5	126°00.0	8.9	8.9	8.9	8.4	7.3	7.4	8.1	7.5	6.7	6.2	6.0	5.4	5.0	4.9	4.9	4.0	1207
15		0928	48°04.3	126°08.5	8.9	8.8	8.7	8.6	7.9	8.0	8.0	7.3	6.9	6.4	6.0	5.5	4.8	4.5	4.2	3.6	1507
16		1200	48°00.5	126°17.0	8.9	8.9	8.9	8.5	8.2	8.3	7.9	7.6	7.2	6.6	5.9	5.2	4.8	4.6	4.5	3.6	1536
17	12/4	0315	48°50.4	125°27.7	8.9	8.7	8.4	8.2	8.2	8.0	-	-	-	-	-	-	-	-	-	8.0	97
18		0236	48°48.7	125°31.0	8.8	9.0	8.7	8.5	8.2	8.1	8.1	-	-	-	-	-	-	-	-	8.1	110
19		0214	48°46.9	125°34.2	9.5	9.0	8.2	8.1	8.2	8.3	8.2	-	-	-	-	-	-	-	-	8.1	138
20		0105	48°43.4	125°40.8	8.9	8.9	8.9	8.7	8.2	8.1	8.1	-	-	-	-	-	-	-	-	8.0	176
21		0551	48°39.9	125°47.4	8.9	8.3	8.0	7.8	7.8	-	-	-	-	-	-	-	-	-	-	7.7	66
22		0625	48°36.5	125°54.0	8.9	8.9	8.3	8.0	8.2	7.8	-	-	-	-	-	-	-	-	-	8.0	90
23		0714	48°32.9	126°00.5	8.6	8.6	8.4	8.0	7.9	7.8	7.7	-	-	-	-	-	-	-	-	7.4	130
24		0746	48°29.4	126°07.1	8.7	8.7	9.0	9.0	8.4	8.5	8.3	7.4	-	-	-	-	-	-	-	6.9	201
25		1002	48°25.9	126°13.7	9.0	8.9	8.8	8.8	8.4	8.4	8.2	7.6	7.0	6.4	6.0	5.6	5.1	5.0	-	4.9	653
26		1127	48°22.4	126°20.2	9.0	8.9	8.9	8.6	8.3	8.3	8.0	7.4	6.9	6.5	6.1	5.3	4.9	4.6	5.2	4.6	1246
27		1210	48°18.9	126°26.7	8.9	8.7	8.6	8.2	8.0	8.1	7.9	7.4	6.9	6.7	6.2	5.3	5.0	4.6	4.3	3.6	1500

Table 4 (cont'd)

Stn. no	Day/ month	Time (PDT)	Lat.	Long.	Standard depths (m)														Bottom	
					0	10	20	30	50	75	100	150	200	250	300	400	500	600	700	°C	(m)
28	13/4	0806	49°00.1	125°43.8	8.9	8.9	8.8	8.5	-	-	-	-	-	-	-	-	-	-	-	8.3	35
29		0826	48°58.3	125°47.0	9.1	9.1	8.3	8.0	-	-	-	-	-	-	-	-	-	-	-	8.0	44
30		0846	48°56.6	125°50.4	8.9	8.9	8.7	8.2	-	-	-	-	-	-	-	-	-	-	-	8.1	44
31		0919	48°53.2	125°57.0	8.5	8.5	8.5	8.2	8.2	-	-	-	-	-	-	-	-	-	-	8.2	68
32		0957	48°49.6	126°03.6	8.5	8.5	9.1	8.6	9.0	8.4	-	-	-	-	-	-	-	-	-	8.3	90
33		1029	48°46.2	126°10.2	8.8	8.8	8.8	8.7	8.1	8.4	8.0	-	-	-	-	-	-	-	-	8.2	139
34		1106	48°42.7	126°16.8	8.8	8.7	8.7	8.4	8.3	8.4	8.1	7.5	6.9	6.4	6.1	5.7	-	-	-	5.3	455
35		1141	48°39.2	126°23.4	8.9	8.8	8.8	8.4	8.4	8.4	8.1	7.5	7.2	6.6	6.1	5.5	5.0	4.9	4.8	4.5	805
36		1214	48°35.7	126°30.0	8.8	8.7	8.7	8.3	8.0	8.3	8.2	7.7	7.1	6.5	6.1	5..6	5.2	4.9	4.4	4.1	1097
37		1247	48°32.2	126°36.6	9.0	8.9	8.8	8.7	8.5	8.4	8.1	7.6	7.0	6.6	6.2	5.7	5.4	MALFUNCTION			1628
38		1319	48°28.8	126°42.9	8.6	8.6	8.6	8.1	8.4	8.2	8.1	7.6	6.8	6.5	6.0	5.6	5.3	4.8	4.5	4.1	1646
39	17/4		49°09.2	125°59.2	8.8	9.1	8.8	-	-	-	-	-	-	-	-	-	-	-	-	8.3	33
40			49°05.9	126°04.5	8.8	8.9	8.7	8.5	-	-	-	-	-	-	-	-	-	-	-	8.2	55
41			49°01.9	126°10.5	8.7	8.3	8.1	8.0	7.9	-	-	-	-	-	-	-	-	-	-	7.8	75
42			48°58.7	126°16.5	8.8	9.2	8.8	8.5	8.2	7.9	7.8	-	-	-	-	-	-	-	-	7.4	123
43			48°55.7	126°22.7	8.6	8.6	8.6	8.5	8.3	8.0	7.7	-	-	-	-	-	-	-	-	6.8	152
44			48°49.3	126°34.7	8.7	8.7	8.7	8.5	8.2	8.1	7.8	7.5	6.7	6.4	5.7	5.5	-	-	-	5.5	428
45			48°43.2	126°46.4	8.7	8.6	8.6	8.3	8.1	8.0	7.8	7.4	6.9	6.6	6.2	5.4	-	-	-	-	1304
46			48°37.6	126°57.3	8.5	8.5	8.5	8.3	8.2	8.1	8.0	7.5	6.8	6.2	5.9	5.4	5.4	-	-	-	2012
47			48°31.2	127°09.3	8.5	8.4	8.4	8.4	8.0	8.0	7.9	7.5	7.1	6.5	6.1	5.4	5.0	-	-	-	2560
48			48°19.0	127°32.0	8.5	8.5	8.5	8.5	8.0	8.0	8.2	8.8	8.3	7.6	7.1	6.4	-	-	-	-	2615
49			48°06.2	127°57.0	8.4	8.4	8.6	8.5	8.4	8.0	7.7	7.7	7.1	6.7	6.3	5.5	5.0	-	-	-	2633
50	19/4	1310	49°16.0	127°01.5	9.0	8.7	8.7	8.4	7.9	7.6	7.5	7.1	-	-	-	-	-	-	-	-	175
51		0952	49°13.5	127°05.0	8.7	8.6	8.5	7.9	7.8	7.7	7.6	7.2	6.6	6.1	5.7	5.2	-	-	-	5.0	450
52		0811	49°07.0	127°13.8	8.4	8.6	8.6	8.5	8.3	8.0	7.8	7.3	6.8	6.4	4.9	5.4	5.1	-	-	-	1518
53	18/4	1917	49°55.0	127°21.2	8.8	8.6	8.6	8.5	8.3	-	-	—	-	-	-	-	-	-	-	8.1	59
54		1810	49°51.5	127°25.0	8.6	8.6	8.7	8.6	8.2	-	-	-	-	-	-	-	-	-	-	8.0	71
54		1647	49°47.0	127°30.5	8.7	8.6	8.6	8.4	8.0	7.8	7.0	-	-	-	-	-	-	-	-	6.8	128

Table 4 (cont'd)

Stn. no	Day/ month	Time (PDT)	Lat.	Long.	Standard depths (m)														Bottom	
					0	10	20	30	50	75	100	150	200	250	300	400	500	600	700	°C	(m)
56		1445	49°40.1	127°40.3	8.4	8.3	8.2	8.2	8.0	8.0	7.8	7.3	6.8	6.4	5.9	5.2	5.0	-	-	-	635
57		0135	49°30.5	127°51.0	8.2	8.2	8.2	8.4	8.2	8.1	8.0	7.5	7.1	6.7	6.3	5.5	5.0	-	--	-	2012
58	12/4	1317	48°15.0	126°40.0	9.0	8.7	8.6	8.5	8.0	8.0	7.9	7.5	7.0	6.3	5.7	5.2	4.9	4.4	4.2	3.6	2195
59		0855	48°22.4	126°04.1	8.6	8.7	8.7	8.6	8.0	8.0	7.9	7.5	7.2	6.6	6.2	-	-	-	-	5.6	388
60		0531	48°40.6	125°46.3	9.0	8.9	8.0	7.9	7.9	7.8	-	-	-	-	-	-	-	-	-	8.0	93
61		0402	48°51.1	125°39.2	9.0	9.0	8.7	8.3	-	-	-	-	-	-	-	-	-	-	-	8.1	49
62	10/4	1443	48°41.2	125°27.1	9.0	9.0	8.7	8.3	8.1	-	-	-	-	-	-	-	-	-	-	8.1	62
63		1527	48°44.2	125°22.0	9.1	8.9	8.4	8.4	8.1	8.0	-	-	-	-	-	-	-	-	-	7.9	101
64		1123	48°28.9	125°15.4	9.3	9.0	8.7	8.6	8.7	7.6	7.2	7.0	-	-	-	-	-	-	-	7.0	151
65	11/4	1806	48°23.4	125°20.8	9.0	8.6	8.1	7.8	7.7	7.9	7.3	-	-	-	-	-	-	-	-	7.2	121

Table 5. Relative abundance estimates of larval sablefish by trackline. (N denotes night tows and D denotes day tows.)

Trackline		Total stations	Stations with larvae	Total caught	Numbers per station	Numbers per 1000 m^3 per station
KYUQUOT SOUND	(N)	6	3	6	1.0	4.5
	(D)	4	1	1	0.25	1.1
NOOTKA SOUND	(N)	4	1	2	0.5	1.1
	(D)	2	1	1	0.5	2.7
CLAYOQUOT SOUND	(N)	11	9	85	7.7	29.5
WICKANINNISH BAY	(N)	9	5	11	1.0	1.5
BARKLEY SOUND	(N)	13	10	311	23.9	38.4
PACHENA POINT	(N)	18	14	392	20.6	30.2
	(D)	11	6	14	1.4	2.8
TOTAL	(N)	61	42	807		
	(D)	17	8	16		

Table 6. Size composition of sablefish larvae by locality and by station number. R/V G.B. REED, April 9-24, 1985. (T represents the total number of sablefish larvae caught in the neustons on designated stations).

Fork length	PACHENA POINT																																
	Day tows							Night tows																Night ("short") tows									
(mm)	1	2	5	8	12	13	T	1	3	4	7	8	9	10	11	12	13	54	55	56	57	T	7-8	8-9	9-10	10-11	11-12	12-13	12-54	53-54	Total[a]
6																									1								1
7																									1								7
8												3		2		2	1	1	1			3			1	1	1	1					34
9												8	3	2	4	1	3	6	4			14		2	1	1	1	12		3			67
10			1				1			1		5	3	1	2	6	4	9	1	1		27	3	5	1	2	5	19	3	1			112
11							0			0		2	3	10	14	5	4	14	0			35	9	9	0	5	20	23	9	9			161
12	1	1					2			0		5	10	6	14	7	13	4	0	1		54	4	9	4	5	23	41	12	12			176
13				1			1			0		4	7	6	16	3	14	1	1	1	1	59	8	6	8	2	30	36	13	9			161
14					1		1		1	0		6	8	6	2	5	8	2	1	0		53	1	13	6	6	17	41	14	9			165
15						2	2			0	1	7	4	3	3	3	1	0		1		38	15	24	4	4	20	38	12	9			112
16						3	3			1	1	4	0	2	5	6	4	1		0		23	10	22	5	2	11	26	8	3			113
17						1	1	1				7	1	2	3	3	8	3		0		28	7	23	9	1	8	23	4	7			101
18						1	1					2	2	0	5	2	5	0		0		26	7	14	2	2	10	23	6	8			75
19						1	1					2	1	0	6	1	3	1		1		14	3	10	1	2	10	23	3	7			51
20						0	1					0	2	0	3	0	2	0		0		8	5	13			6	7	2	8			14
21						1	1					1		0	0	1	1	1		0		2	2	4			2	1	1	2			11
22												2		1	1	0	0	0		1		4	1	3			1	1		0			6
23															0	0	1	1				2		4						0			5
24															1	0	0	0				2		3						1			2
25																1	1	1				3		1									
26																																	
27																																	
28																																	
29																																	
30																																	
31																																	
32																																	
33																																	
34																																	
Total	1	1	1	1	1	9	14	1	1	2	2	58	42	44	71	43	70	45	7	5	1	392	75	165	48	32	165	315	87	81	1374		
$\bar{x}$ FL(mm)						16.3															14.1											14.6	

[a]Total represents transect total from all tows (day plus night).

Table 6 (cont'd)

Fork length (mm)	CLAYOQUOT SOUND Night tow 29	30	33	34	35	36	37	38	39	Total[a]	NOOTKA SOUND Day tow 42	Night tow 42	Total[a]	KYUQUOT SOUND Day tow 45	Night tows 46	47	48	T	Total[a]	Survey Total[a] Day	Night	Grand Total[a]
6								1	1	2											1	1
7							2	3	2	7		1	1								3	3
8							5	2	0	7		0	0							1	168	169
9					1		2	2	0	5		0	0							0	239	239
10			1		2	3	6	1	0	13		0	0				1	1	1	2	256	258
11			0		1	3	6	4	0	14		0	0		1		1	2	2	1	255	256
12			1		2	4	2	1	0	10		0	0			1	1	2	3	1	260	261
13			1		0	1	1	6	0	10		0	0	1		0		0	0	3	178	181
14			1		0	1	1	1	0	4		0	0			1		1	1	3	206	209
15			1		0	1	1	1	1	5		1	1							1	193	194
16			0		1		1	1		3	1		1							1	142	143
17		1	0				1			2										2	95	97
18			0				1			1										0	34	34
19			0							0										1	23	24
20			0							0											10	10
21			1							1											8	8
22			0							0											4	4
23			0							0											1	1
24			0							0											0	0
25			1							1											0	0
26										0											0	0
27										0											0	0
28										0											0	0
29										0											0	0
30										0											0	0
31										0											0	0
32										0											0	0
33										0											0	0
34				1						1											1	1
Total	1	1	6	1	7	13	29	23	4	85	1	2	3	1	1	2	3	6	7	16	2242	2258
$\bar{x}$ FL(mm)										17.6	20.0	15.0	16.7	16.0					15.7	16.5	14.9	14.9

Table 6 (cont'd)

Fork length (mm)	CLAYOQUOT SOUND Night tow 29	30	33	34	35	36	37	38	39	Total[a]	NOOTKA SOUND Day tow 42	Night tow 42	Total[a]	KYUQUOT SOUND Day tow 45	Night tows 46	47	48	T	Total[a]	Survey Total[a] Day	Night	Grand Total[a]
6								1	1	2											1	1
7							2	3	2	7		1	1							1	168	169
8							5	2	0	7		0	0							0	239	239
9					1		2	2	0	5		0	0							2	256	258
10			1		2	3	6	1	0	13		0	0				1	1	1	1	255	256
11			0		1	3	6	4	0	14		0	0		1		1	2	2	1	260	261
12			1		2	4	2	1	0	10		0	0	1		1	1	2	3	3	178	181
13	1		1		0	1	1	6	0	10		0	0			0		0	0	3	206	209
14			1		0	1	1	1	0	4		0	0			1		1	1	1	193	194
15			1		0	1	1	1	1	5		1	1							1	142	143
16			0		1		1	1		3	1		1							2	95	97
17		1	0				1			2										0	34	34
18			0				1			1										1	23	24
19			0							0											10	10
20			0							0											8	8
21			1							1											4	4
22										0											1	1
23										0											0	0
24										0											0	0
25										0											0	0
26										0											0	0
27										0											0	0
28										0											0	0
29										0											0	0
30										0											0	0
31										0											0	0
32										0											0	0
33				1						1											1	1
34																						
Total	1	1	6	1	7	13	29	23	4	85	1	2	3	1	1	2	3	6	7	16	2242	2258
$\bar{x}$ FL(mm)										17.6	20.0	15.0	16.7	16.0					15.7	16.5	14.9	14.9

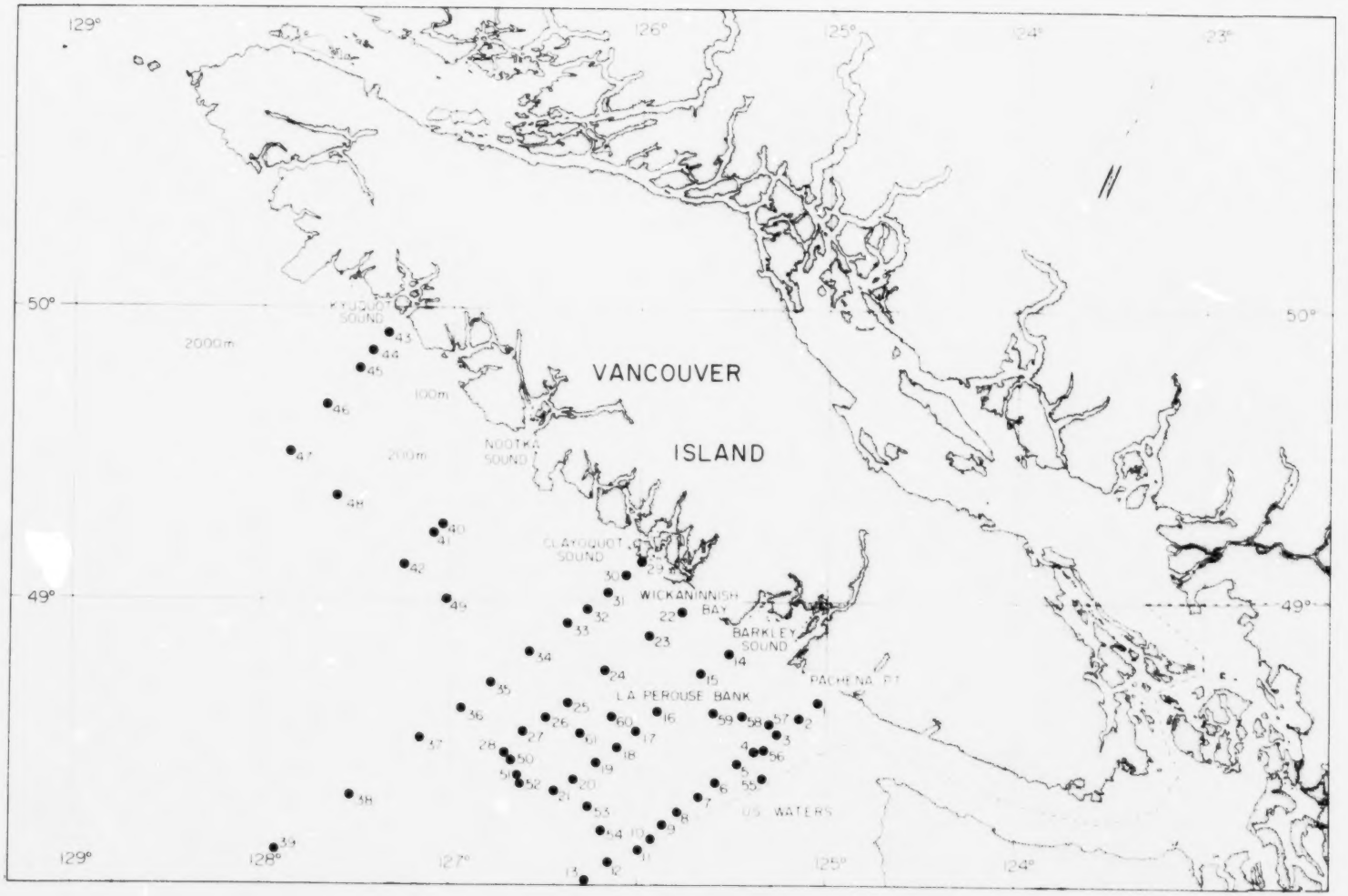

Fig. 1. Location of the neuston stations. R/V G.B. REED, April 9-24, 1985.

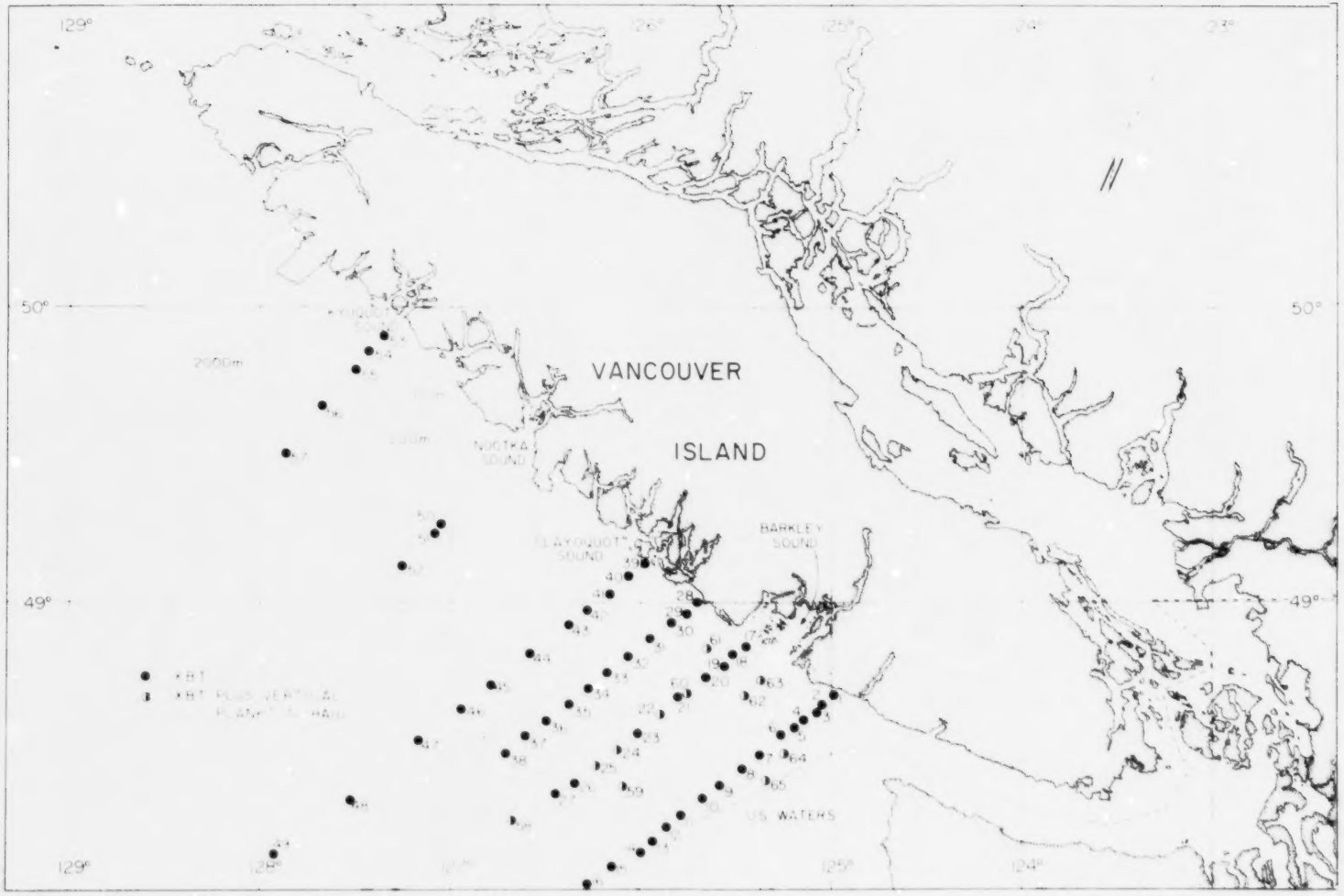

Fig. 2. Location of the XST and vertical plankton haul stations. R/V G.B. REED, April 9-24, 1985.

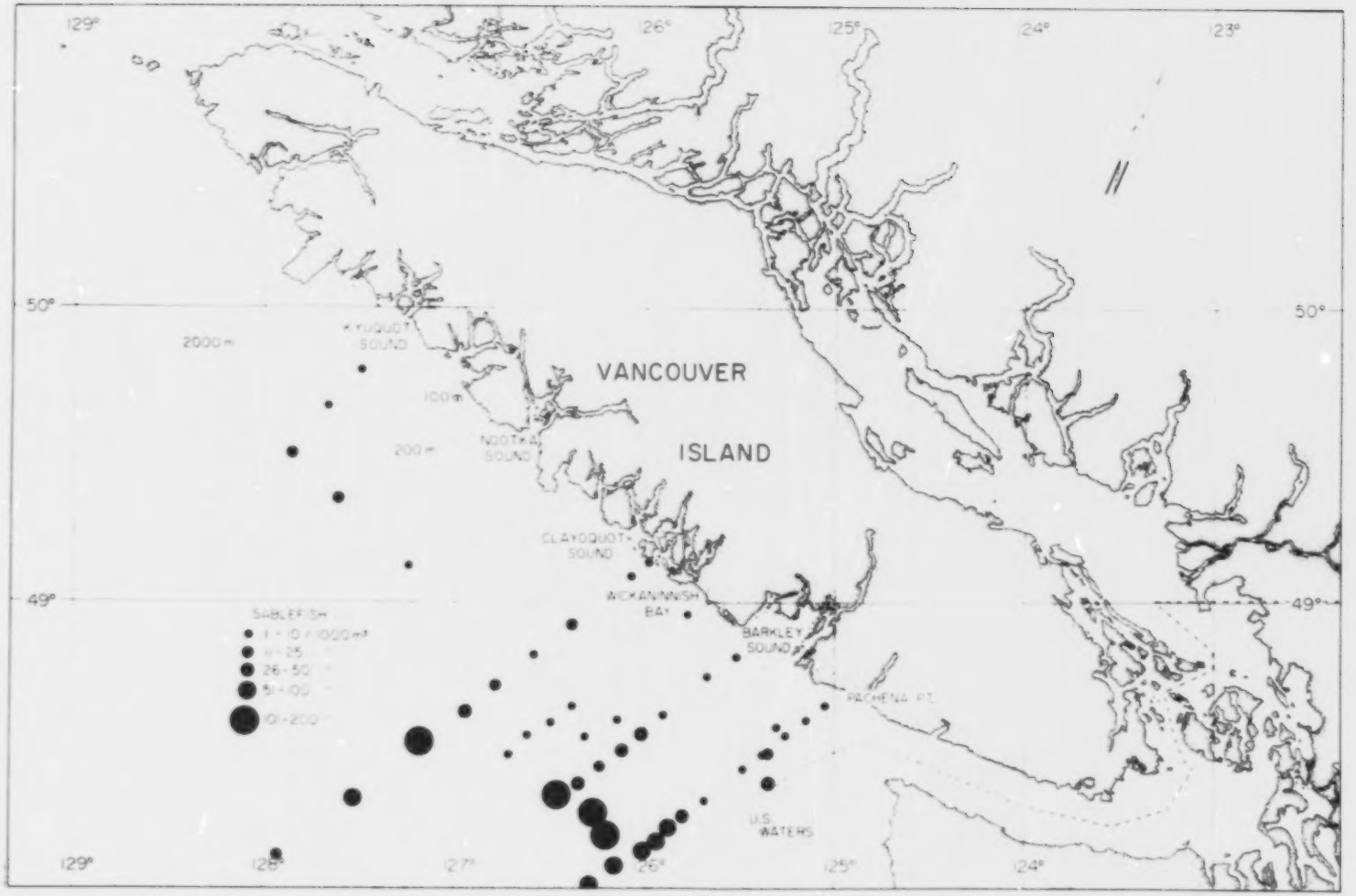

Fig. 3. Distribution of sable fish larvae from neuston tows. R/V G.B. REED, April 9-24, 1985. (Relative abundance expressed as numbers per 1000 m^3.)

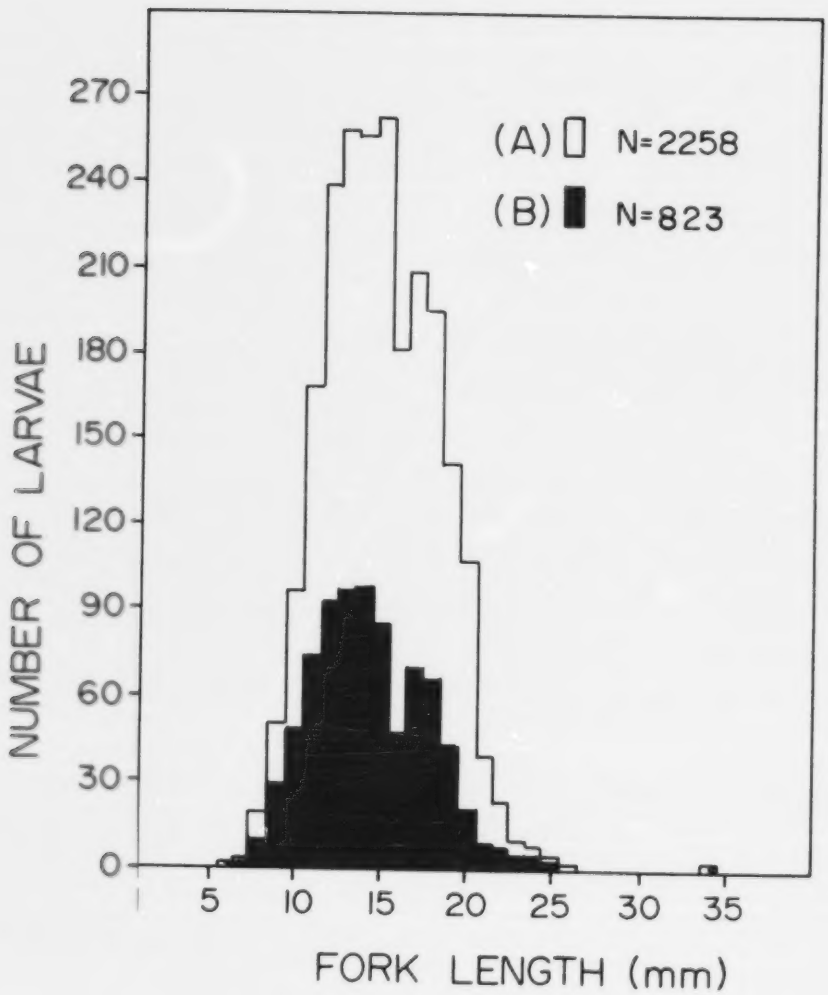

Fig. 4. Length frequency of sablefish larvae caught in the neuston tows. (A) Grand total of all sablefish larvae caught; (B) Total of sablefish larvae excluding catches from the "short" tows.

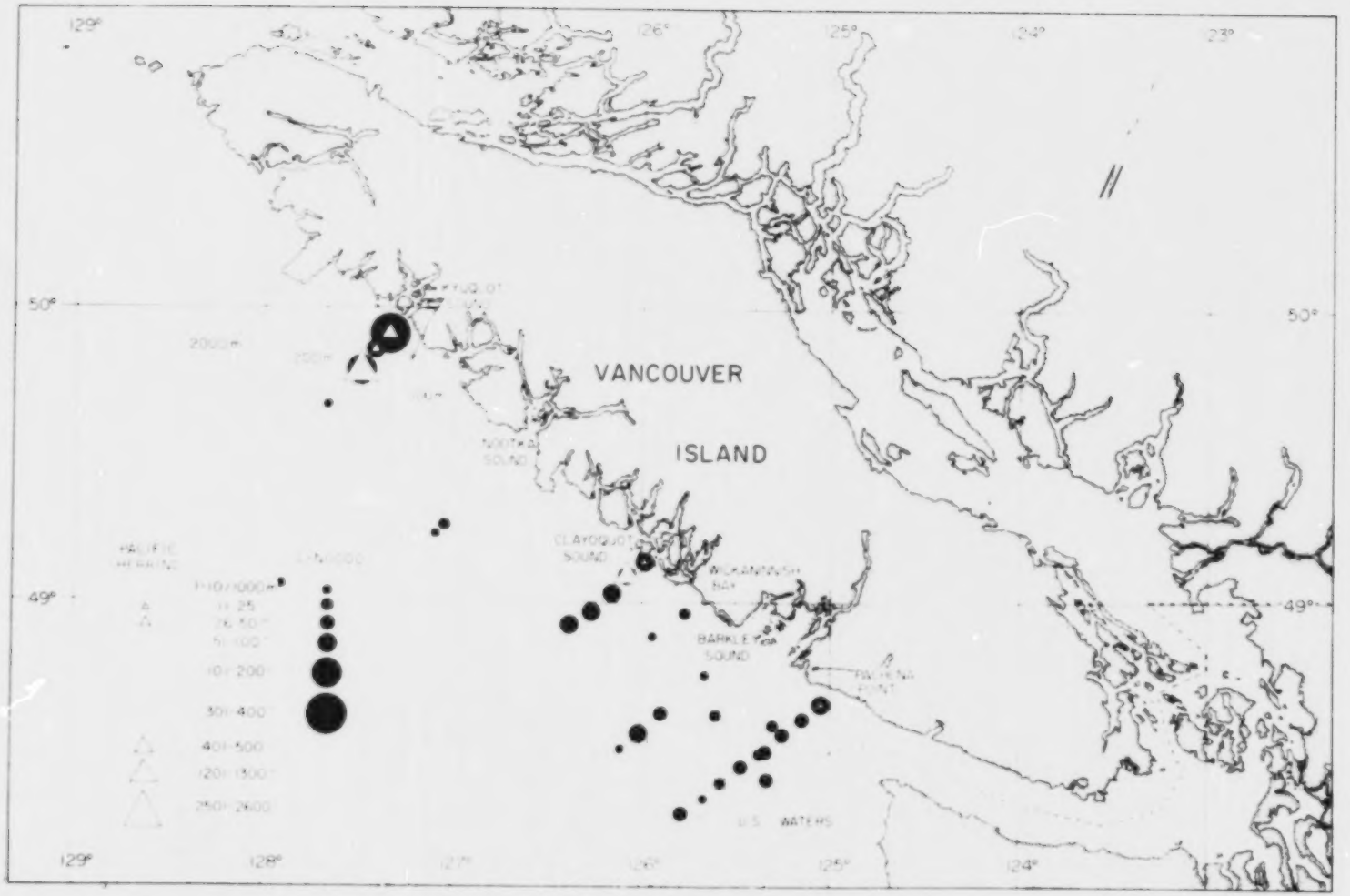

Fig. 5. Distribution of Pacific herring and lingcod larvae from neuston tows. R/V G.B. REED, April 9-24, 1985. (Relative abundance expressed as numbers per 1000 m3.)

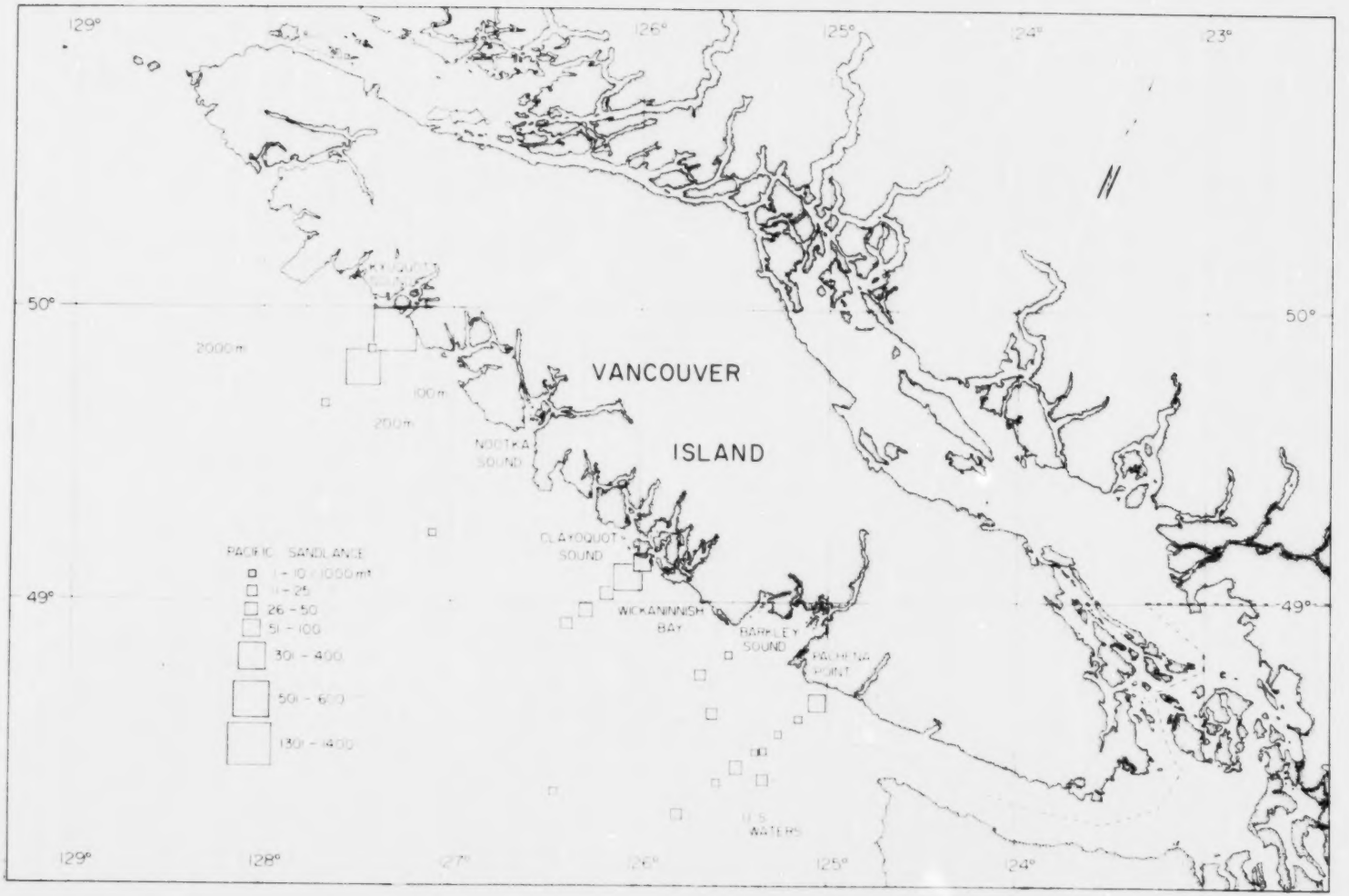

Fig. 6. Distribution of Pacific sand lance larvae from neuston tows. R/V G.B. REED, April 9-24, 1985. (Relative abundance expressed as numbers per 1000 m^3.)

Appendix table 1. Set locations of the neuston plankton tows. R/V G.B. REED, April 9-24, 1985. (D indicates tows conducted during daylight hours.)

Locality	Stn no.	Date	Time	Latitude	Longitude	Bottom depth (m/fath)	Flow meter total
PACHENA POINT							
	1	Apr. 10	0609D	48°39.0	125°02.4	53/29	27385
			0624D				29371
			1900				23534
			1920				32673
	2	Apr. 10	0722D	48°35.7	125°08.7	112/61	32288
			0737D				33375
			2000				30003
			2020				29135
	3	Apr. 10	0845D	48°32.2	125°15.5	113/62	29929
			0900D				27647
			2100			117/64	27325
			2120				32295
	4	Apr. 10	1010D	48°28.6	125°22.1	157/86	31019
			1025D				28126
			2158				27675
			2218				26399
	5	Apr. 10	2256	48°25.3	125°28.6	141/77	22364
		Apr. 11	0010				23267
			1715D	48°25.3	125°28.7	146/80	23395
	6	Apr. 11	0109	48°22.0	125°34.8	152/83	29653
			0129				24974
			1627D				19099
	7	Apr. 11	0247	48°18.6	125°41.4	154/84	22755
			0307				22034
			1543D			150/82	29559
	8	Apr. 11	0433	48°15.2	125°47.8	216/118	18603
			0453				19951
			0513				26638
			1455D			203/111	12839
		Apr. 14	0410			216/118	28685
			0423				24939
		Apr. 21	2010	48°15.2	125°47.7	220/120	25358
	9	Apr. 14	0228	48°12.9	125°51.9	534/292	31118
			0240				22723
		Apr. 21	2120			545/298	17303

Appendix table 1 (cont'd)

Locality	Stn no.	Date	Time	Latitude	Longitude	Bottom depth (m/fath)	Flow meter total
	10	Apr. 11	0652D	48°10.6	125°56.1	951/520	34995
			0712D				25675
		Apr. 14	0037				30753
			0052				25563
		Apr. 21	2221			1302/712	21130
	11	Apr. 13	2334	48°08.5	126°00.0	1149/628	36950
			2349				40827
	12	Apr. 11	0928D	48°04.3	126°08.5	1507/824	30515
			0948D				24741
		Apr. 13	2134			1573/860	37737
			2149				38033
	13	Apr. 11	1200D	48°00.5	126°17.0	1536/840	17005
			1220D				22537
		Apr. 13	1938			1554/850	31386
			1953				37415
BARKLEY SOUND							
	14	Apr. 12	0236	48°48.7	125°31.0	110/60	36485
	15	Apr. 12	0105	48°44.4	125°40.8	176/96	35333
	16	Apr. 13	0535	48°36.5	125°54.0		28866
			0542				29606
			0550				24012
	17	Apr. 13	0439	48°32.5	126°00.5		24777
			0454				29099
			0519				25182
	18	Apr. 13	0247	48°29.5	126°07.1	1298/710	24343
			0302				23049
			0317				22871
	19	Apr. 13	0023	48°25.9	126°13.7	677/370	26183
			0038				26291
			0053				24225
	20	Apr. 12	2316	48°22.4	126°20.2	1259/688	21940
			2336				22653
			2351				30007
		Apr. 15	2335	48°11.1	126°11.1	1545/845	37176
		Apr. 16	0342	48°22.4	126°20.2	1259/688	34057

Appendix table 1 (cont'd)

Locality	Stn no.	Date	Time	Latitude	Longitude	Bottom depth (m/fath)	Flow meter total
	21	Apr. 12	1938 1953 2008	48°20.0	126°26.3	1498/819	26452 30354 24822
WICKANINNISH BAY							
	22	Apr. 14	1938 1945	48°58.0	125°46.5	44/24	34707 32513
	23	Apr. 14	2046 2101	48°53.1	125°57.0	64/35	33420 35888
	24	Apr. 14	2202 2217	48°46.2	126°10.2	139/76	26557 35411
	25	Apr. 14	2324 2339	48°39.2	126°23.4	779/426	29981 41202
	26	Apr. 15	0120 0135	48°35.7	126°30.0	1646/900	37240 36657
	27	Apr. 15	0310 0325	48°32.2	126°36.6	1628/890	38763 38542
	28	Apr. 15	0404 0419	48°28.8	126°42.9	1646/900	26077 35758
CLAYOQUOT SOUND							
	29	Apr. 16	1815	49°08.0	125°59.0	27/15	54608
	30	Apr. 16	1853	49°05.1	126°04.5	53/29	49543
	31	Apr. 16	1930	49°02.0	126°10.3	73/40	56585
	32	Apr. 16	2027	48°58.6	126°16.7	123/67	50886
	33	Apr. 16	2112	48°55.6	126°22.9	154/84	52650
	34	Apr. 16	2225	48°49.2	126°34.9	362/198	54380
	35	Apr. 16	2335	48°43.1	126°46.5	1304/713	52546
	36	Apr. 17	0044	48°37.6	126°57.3	2012/1100	38280
	37	Apr. 17	0206	48°31.2	127°09.3	2560/1400	47535
	38	Apr. 17	0411	48°19.0	127°32.0	2615/1430	52788

Appendix table 1 (cont'd)

Locality	Stn no.	Date	Time	Latitude	Longitude	Bottom depth (m/fath)	Flow meter total
	39	Apr. 17	0632D	48°06.7	127°56.7	2633/1440	50007
NOOTKA SOUND							
	40	Apr. 19	2230	49°16.0	127°01.5	176/96	17664
	41	Apr. 19	1000D	49°13.5	127°05.0	450/246	21759
			2300	49°13.7	127°06.5	497/272	19020
			2328				18681
			2345				20243
	42	Apr. 19	0810D	49°07.0	127°13.8	1518/830	17896
		Apr. 20	0040				22673
			0055				18434
KYUQUOT SOUND							
	43	Apr. 18	1917	49°55.0	127°21.2	59/32	15807
			2004				15900
	44	Apr. 18	1810D	49°51.5	127°25.0	71/39	17097
			2055				17307
	45	Apr. 18	1647D	49°47.2	127°29.0	128/70	21765
			2200				20158
	46	Apr. 18	1445D	49°40.1	127°40.3	635/347	16288
			2258				25649
	47	Apr. 18	1215D	49°30.5	127°51.0	2012/1100	-
		Apr. 19	0027				18450
	48	Apr. 19	0204	49°21.0	127°36.0	1701/930	23225
NOOTKA SOUND							
	49	Apr. 20	0205	49°00.5	127°01.5	1042/570	24264
WICKANINNISH BAY							
	50	Apr. 15	0443	48°26.2	126°40.6	1500/820	30969
			0453				14332
	51	Apr. 15	0506	48°23.8	126°38.4	1810/990	13756
			0516				12594
BARKLEY SOUND							
	52	Apr. 15	0550	48°21.4	126°36.2	1994/1090	17655
			0600				15722
	53	Apr. 16	0137	48°16.5	126°15.6	1189/650	28288
			0143				35185

Appendix table 1 (cont'd)

Locality	Stn no.	Date	Time	Latitude	Longitude	Bottom depth (m/fath)	Flow meter total
PACHENA POINT							
	54	Apr. 15	2335	48°11.1	126°11.1	1545/845	37176
	55	Apr. 11	1806	48°23.2	125°20.8	124/68	25236
	56	Apr. 11	2045	48°28.6	125°19.8	163/89	18444
			2100				25041
			2115				32181
			2130				16203
	57	Apr. 11	2200	48°33.6	125°18.7	112/61	18968
	58	Apr. 11	2257	48°35.7	125°27.0	130/71	24464
BARKLEY SOUND							
	59	Apr. 11	2400	48°36.3	125°36.1	124/68	25688
	60	Apr. 22	0435	48°35.7	126°08.8	283/155	19554
	61	Apr. 22	0515	48°32.2	126°18.3	768/420	19480

Appendix table 2. Set locations of the vertical plankton hauls. R/V G.B. REED, April 9-24, 1985.

Stn. no.	Date	Time	Latitude	Longitude	Bottom depth m/fath	Net depth m/fath
22	Apr. 12	0625	48°36.5	125°54.0	90/49	86/47
24		0758	48°28.4	126°08.0	230/126	227/124
25		1024	48°24.7	126°15.8	970/533	625/340
58		1317	48°15.0	126°40.0	2195/1200	70/380
59		0855	48°22.4	126°04.1	388/212	384/210
60		0531	48°40.6	125°46.3	93/51	90/49
61		0402	48°51.5	125°39.2	49/27	46/25
62	Apr. 10	1443	48°41.2	125°27.1	62/34	119/65
63		1530	48°44.9	125°22.0	100/55	98/54
64		1123	48°28.9	125°15.4	152/83	148/81
65	Apr. 11	1806	48°23.4	125°20.8	121/66	117/64

Appendix table 3. Number of sablefish larvae identified per station and the relative abundance estimates (mean numbers/1000 m^3). R/V G.B. REED, April 9-24, 1985. (D indicates tows conducted during daylight hours.)

Locality	Stn. no.	Date	Time	Volume of tow (m^3/tow)	Sablefish		
					Total nos.	Nos./ 1000 m^3	Nos./ 1000 m^3/ stn.
PACHENA POINT	1	Apr. 10	0609D	283.6	-	-	1.7
			0624D	304.2	1	3.3	
			1900	243.7	-	-	1.5
			1920	338.4	1	3.0	
	2	Apr. 10	0722D	334.4	1	3.0	1.5
			0737D	345.7	-	-	
			2000	310.7	-	-	-
			2020	301.8	-	-	
	3	Apr. 10	0845D	310.0	-	-	-
			0900D	286.3	-	-	
			2100	283.0	-	-	1.5
			2120	334.5	1	3.0	
	4	Apr. 10	1010D	321.3	-	-	-
			1025D	291.3	-	-	
			2158	286.6	1	3.5	3.6
			2218	273.4	1	3.7	
	5	Apr. 10	2256	231.6	-	-	-
		Apr. 11	0010	241.0	-	-	
			1715D	242.3	1	4.1	4.1
	6	Apr. 11	0109	307.1	-	-	-
			0129	258.7	-	-	
			1627D	197.8	-	-	-
	7	Apr. 11	0247	235.7	2	8.5	
			0307	228.2	-	-	4.3
			1543D	306.1	-	-	
	8	Apr. 11	0433	289.0	5	17.3	
			0453	309.9	6	19.4	
			0513	275.9	5	18.1	34.6
			1455D	133.0	1	7.5	7.5
		Apr. 14	0410	297.1	9	30.3	
			0423	258.3	8	31.0	
		Apr. 21	2010	262.6	24	91.4	

Appendix table 3 (cont'd)

Locality	Stn. no.	Date	Time	Volume of tow (m^3/tow)	Sablefish		
					Total nos.	Nos./ 1000 m^3	Nos./ 1000 m^3/ stn.
PACHENA POINT	9	Apr. 14	0228	322.3	15	46.5	
			0240	235.3	8	34.0	62.2
		Apr. 21	2120	179.2	19	106.0	
	10	Apr. 11	0652D	543.7	-	-	-
			0712D	398.9	-	-	
		Apr. 14	0037	318.5	20	62.8	
			0052	264.8	17	64.2	53.0
		Apr. 21	2221	218.8	7	32.0	
	11	Apr. 13	2334	382.7	58	151.6	91.2
			2349	422.8	13	30.7	
	12	Apr. 11	0928D	474.1	1	2.1	1.1
			0948D	384.4	-	-	
		Apr. 13	2134	390.8	26	66.5	54.9
			2149	393.9	17	43.2	
	13	Apr. 11	1200D	264.2	4	15.1	14.7
			1220D	350.1	5	14.3	
		Apr. 13	1938	325.1	35	107.7	99.0
			1953	387.5	35	90.3	
BARKLEY SOUND	14	Apr. 12	0236	377.9	1	2.6	2.6
	15	Apr. 12	0105	365.9	1	2.7	2.7
	16	Apr. 13	0535	299.0	3	10.0	3.3
			0545	306.6	-	-	
			0550	248.7	-	-	
	17	Apr. 13	0439	256.6	4	15.6	
			0454	301.4	12	39.8	33.8
			0519	260.8	12	46.0	
	18	Apr. 13	0247	252.1	7	27.8	
			0302	238.7	7	29.3	28.9
			0317	236.9	7	29.5	
	19	Apr. 13	0023	271.2	2	7.4	
			0038	272.3	4	14.7	15.3
			0053	250.9	6	23.9	

Appendix table 3 (cont'd)

Locality	Stn. no.	Date	Time	Volume of tow (m^3/tow)	Sablefish		
					Total nos.	Nos./ 1000 m^3	Nos./ 1000 m^3/ stn.
BARKLEY SOUND	20	Apr. 12	2316	227.2	4	17.6	
			2336	234.6	8	34.1	
			2351	310.8	21	67.6	27.3
		Apr. 15	2335	385.0	45	11.7	
		Apr. 16	0342	352.7	2	5.7	
	21	Apr. 12	1938	274.0	36	131.4	
			1953	314.4	33	104.9	106.0
			2008	257.1	21	81.7	
WICKANINNISH BAY	22	Apr. 14	1938	359.5	-	-	4.5
			1945	336.7	3	8.9	
	23	Apr. 14	2046	346.1	-	-	-
			2101	371.7	-	-	
	24	Apr. 14	2202	275.1	-	-	-
			2217	366.7	-	-	
	25	Apr. 14	2324	310.5	1	3.2	2.8
			2339	426.7	1	2.3	
	26	Apr. 15	0120	385.7	1	2.6	1.3
			0135	379.7	-	-	
	27	Apr. 15	0310	401.5	-	-	3.8
			0325	399.2	3	7.5	
	28	Apr. 15	0404	270.1	-	-	2.7
			0419	370.3	2	5.4	
CLAYOQUOT SOUND	29	Apr. 16	1815	297.9	1	3.4	3.4
	30	Apr. 16	1853	270.3	1	3.7	3.7
	31	Apr. 16	1930	308.7	-	-	-
	32	Apr. 16	2027	277.6	-	-	-
	33	Apr. 16	2112	287.2	6	20.9	20.9
	34	Apr. 16	2225	296.7	1	3.4	3.4
	35	Apr. 16	2335	286.7	7	24.4	24.4

Appendix table 3 (cont'd)

Locality	Stn. no.	Date	Time	Volume of tow (m^3/tow)	Sablefish		
					Total nos.	Nos./ 1000 m^3	Nos./ 1000 m^3/ stn.
CLAYOQUOT SOUND	36	Apr. 17	0044	208.8	13	62.3	62.3
	37	Apr. 17	0206	259.3	29	111.8	111.8
	38	Apr. 17	0411	287.9	23	79.9	79.9
	39	Apr. 17	0632	272.8	4	14.7	14.7
NOOTKA SOUND	40	Apr. 19	2230	182.9	-	-	-
	41	Apr. 19	1000D	225.4	-	-	-
			2300	197.0	-	-	-
			2328	193.5	-	-	
			2345	210.0	-	-	
	42	Apr. 19	0810D	185.4	1	5.4	5.4
		Apr. 20	0040	234.8	2	8.5	4.3
			0050	190.9	-	-	
KYUQUOT SOUND	43	Apr. 18	1917	163.7	-	-	-
			2004	164.6	-	-	
	44	Apr. 18	1810D	177.1	-	-	-
			2055	197.2	-	-	-
	45	Apr. 18	1647D	225.4	1	4.4	4.4
			2200	208.8	-	-	-
	46	Apr. 18	1445D	168.7	-	-	-
			2258	265.6	1	3.8	3.8
	47	Apr. 18	1215D	-	-	-	-
		Apr. 19	0027	191.1	2	10.5	10.5
	48	Apr. 19	0204	240.5	3	12.5	12.5
NOOTKA SOUND	49	Apr. 20	0205	251.3	-	-	-
WICKANINNISH BAY	50	Apr. 15	0443	320.7	-	-	-
			0453	148.4	-	-	
	51	Apr. 15	0506	142.5	-	-	-
			0516	130.4	-	-	
	52	Apr. 15	0550	182.9	-	-	-
			0600	162.8	-	-	

Appendix table 3 (cont'd)

Locality	Stn. no.	Date	Time	Volume of tow (m^3/tow)	Sablefish		
					Total nos.	Nos./ 1000 m^3	Nos./ 1000 m^3/ stn.
BARKLEY SOUND	53	Apr. 16	0137	292.9	77	262.9	131.4
			0143	364.4	-	-	
PACHENA POINT	54	Apr. 15	2335	385.0	45	116.9	116.9
	55	Apr. 11	1806	261.4	7	26.8	26.8
	56	Apr. 11	2045	191.0	1	5.2	
			2100	259.4	1	3.9	
			2115	333.3	2	60.1	18.8
			2130	167.8	1	5.9	
	57	Apr. 11	2200	196.5	1	5.1	5.1
	58	Apr. 11	2257	253.4	-	-	-
	59	Apr. 11	2400	266.0	-	-	-
BARKLEY SOUND	60	Apr. 22	0435	202.5	1	4.9	4.9
	61	Apr. 22	0515	201.8	2	9.9	9.9

Appendix table 4. Numbers of Pacific herring, lingcod, and Pacific sand lance caught per station and their relative abundance estimates (mean numbers/1000 m^3). R/V G.B. REED, April 9-24, 1985. (D indicates tows conducted during daylight hours.)

				Pacific herring			Lingcod			Pacific sand lance		
Locality	Stn. no.	Date	Time	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.
PACHENA POINT	1	Apr. 10	0609D	-	-	-	15	52.9	103.7	20	70.5	74.7
			0624D	-	-		47	154.5		24	78.9	
			1900	-	-	1.5	7	28.7	29.1	6	24.6	27.1
			1920	1	3.0		10	29.5		10	29.6	
	2	Apr. 10	0722D	-	-	-	5	14.9	8.9	1	3.0	3.0
			0737D	-	-		1	2.9		1	2.9	
			2000	-	-	-	4	12.9	37.9	-	-	-
			2020	-	-		19	62.9	-	-	-	
	3	Apr. 10	0845D	-	-	-	1	3.2	1.6	1	3.2	1.6
			0900D	-	-		-	-		-	-	
			2100	-	-	-	7	24.7	27.3	1	3.5	4.8
			2120	-	-		10	29.9		2	6.0	
	4	Apr. 10	1010D	-	-	-	-	-	1.7	-	-	-
			1025D	-	-		1	3.4		-	-	
			2158	-	-	-	4	14.0	18.0	1	3.5	1.8
			2218	-	-		6	21.9		-	-	
	5	Apr. 10	2256	-	-	-	7	30.2	46.2	-	-	-
		Apr. 11	0010	-	-		15	62.2		-	-	
			1715D	-	-	-	11	45.4	45.4	9	37.1	37.1
	6	Apr. 11	0109	-	-	-	8	26.1	20.8	1	3.3	3.6
			0129	-	-		4	15.5		1	3.9	
			1627D	-	-	-	2	10.1	10.1	-	-	-

Appendix table 4 (cont'd)

Locality	Stn. no.	Date	Time	Pacific herring			Lingcod			Pacific sand lance		
				Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.
PACHENA POINT	7	Apr. 11	0247	-	-		2	8.5		-	-	
			0307	-	-	-	2	8.8	8.7	-	-	-
			1543D	-	-		2	6.5		-	-	
	8	Apr. 11	1455D	-	-	-	-	-	-	-	-	-
			0433	-	-		4	13.8		-	-	
			0453	-	-	-	30	96.8		13	41.9	12.4
			0513	-	-		7	25.4	36.0	9	32.6	
		Apr. 14	0410	-	-		1	3.4		-	-	
			0423	-	-		3	11.6		-	-	
		Apr. 21	2010	-	-		17	64.7		-	-	
	9	Apr. 14	0228	-	-		-	-		-	-	
			0240	-	-	-	-	-	-	-	-	-
		Apr. 21	2120	-	-		-	-		-	-	
	10	Apr. 11	0652D	-	-	-	-	-	-	-	-	-
			0712D	-	-		-	-		-	-	
		Apr. 14	0037	-	-		-	-		-	-	
			0052	-	-	-	-	-	-	-	-	-
		Apr. 21	2221	-	-		-	-		-	-	
	11	Apr. 13	2334	-	-	-	-	-	-	-	-	-
			2349	-	-		-	-		-	-	
	12	Apr. 11	0928D	-	-	-	-	-	-	-	-	-
			0948D	-	-		-	-		-	-	
		Apr. 13	2134	-	-	-	-	-	-	-	-	-
			2149	-	-		-	-		-	-	

Appendix table 4 (cont'd)

Locality	Stn. no.	Date	Time	Pacific herring			Lingcod			Pacific sand lance		
				Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.
PACHENA POINT	13	Apr. 11	1200D	-	-	-	-	-	-	-	-	-
			1220D	-	-		-	-		-	-	
		Apr. 13	1938	-	-	-	-	-	-	-	-	-
			1953	-	-		-	-		-	-	
BARKLEY SOUND	14	Apr. 12	0236	-	-	-	-	-	-	3	7.9	7.9
	15	Apr. 12	0105	-	-	-	2	5.5	5.5	-	-	-
	16	Apr. 13	0535	-	-		11	36.8		11	36.8	
			0545	-	-	-	6	19.6	30.9	5	16.3	17.7
			0550	-	-		9	36.2		-	-	
	17	Apr. 13	0439	-	-		10	38.9		-	-	
			0454	-	-	-	12	39.8	59.5	-	-	-
			0519	-	-		26	99.7		-	-	
	18	Apr. 13	0247	-	-		1	4.0		-	-	
			0302	-	-	-	-	-	1.3	-	-	-
			0317	-	-		-	-		-	-	
	19	Apr. 13	0023	-	-		-	-		-	-	
			0038	-	-	-	-	-	-	-	-	-
			0053	-	-		-	-		-	-	
	20	Apr. 12	2316	-	-		-	-		-	-	
			2336	-	-		-	-		-	-	
			2351	-	-	-	-	-	-	-	-	-
		Apr. 15	2335	-	-		-	-		-	-	
		Apr. 16	0342	-	-		-	-		-	-	

Appendix table 4 (cont'd)

Locality	Stn. no.	Date	Time	Pacific herring			Lingcod			Pacific sand lance		
				Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.
BARKLEY SOUND	21	Apr. 12	1938	-	-		-	-		2	7.3	
			1953	-	-	-	-	-	-	-	-	2.4
			2008	-	-		-	-		-	-	
WICKANINNISH BAY	22	Apr. 14	1938	-	-	-	8	22.3	23.1	-	-	-
			1945	-	-		8	23.8		-	-	
	23	Apr. 14	2046	-	-	-	1	2.9	1.4	-	-	-
			2101	-	-		-	-		-	-	
	24	Apr. 14	2202	-	-	-	-	-	-	-	-	-
			2217	-	-		-	-		-	-	
	25	Apr. 14	2324	-	-	-	-	-	-	-	-	-
			2339	-	-		-	-		-	-	
	26	Apr. 15	0120	-	-	-	-	-	-	-	-	-
			0135	-	-		-	-		-	-	
	24	Apr. 15	0310	-	-	-	-	-	-	-	-	-
			0325	-	-		-	-		-	-	
	28	Apr. 15	0404	-	-	-	-	-	-	-	-	-
			0419	-	-		-	-		-	-	
CLAYOQUOT SOUND	29	Apr. 16	1815	1	3.4	3.4	21	70.5	70.5	22	73.9	73.9
	30	Apr. 16	1853	330	1220.9	1220.9	26	96.2	96.2	85	314.5	314.5

Appendix table 4 (cont'd)

Locality	Stn. no.	Date	Time	Pacific herring			Lingcod			Pacific sand lance		
				Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.
CLAYOQUOT SOUND	31	Apr. 16	1930	0	-	-	16	51.8	51.8	8	25.9	25.9
	32	Apr. 16	2027	0	-	-	26	84.2	84.2	8	28.8	28.8
	33	Apr. 16	2112	0	-	-	23	80.1	80.1	3	10.5	10.5
	34	Apr. 16	2225	0	-	-	0	-	-	0	-	-
	35	Apr. 16	2335	0	-	-	0	-	-	0	-	-
	36	Apr. 17	0044	0	-	-	0	-	-	0	-	-
	37	Apr. 17	0206	0	-	-	0	-	-	0	-	-
	38	Apr. 17	0411	0	-	-	0	-	-	0	-	-
	39	Apr. 17	0632D	0	-	-	0	-	-	0	-	-
NOOTKA SOUND	40	Apr. 19	2230	-	-	-	3	16.4	16.4	-	-	-
	41	Apr. 19	1000D	-	-	-	-	-	-	-	-	-
			2300	-	-		3	15.2		1	5.1	
			2328	-	-	-	2	10.3	6.4	-	-	1.7
			2345	-	-		-	-		-	-	
	42	Apr. 19	0810D	-	-	-	-	-	-	-	-	-
		Apr. 20	0040	-	-	-	-	-	-	-	-	-
			0055	-	-		-	-		-	-	

Appendix table 4 (cont'd)

Locality	Stn. no.	Date	Time	Pacific herring			Lingcod			Pacific sand lance		
				Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.
KYUQUOT SOUND	43	Apr. 18	1917	126	770.0	454.9	57	348.2	353.3	429	2620.6	1310.3
			1004	23	139.7		59	358.4		-	-	
	44	Apr. 18	1810D	2	11.3	11.3	10	56.5	56.5	1	5.6	5.6
			2055	-	-	-	1	5.6	5.6	-	-	-
	45	Apr. 18	1647D	578	2564.3	2564.3	44	195.2	195.2	113	501.3	501.3
			2200	-	-	-	3	14.4	14.4	1	4.8	4.8
	46	Apr. 18	1445D	-	-	-	-	-	-	-	-	-
			2258	-	-	-	1	3.8	3.8	1	3.8	3.8
	47	Apr. 18	1215D	-	-	-	-	-	-	-	-	-
		Apr. 19	0027	-	-	-	-	-	-	-	-	-
	48	Apr. 19	0204	-	-	-	-	-	-	-	-	-
NOOTKA SOUND	49	Apr. 20	0205	-	-	-	-	-	-	-	-	-
WICKANINNISH BAY	50	Apr. 15	0443	-	-	-	-	-	-	-	-	-
			0453	-	-	-	-	-	-	-	-	-
	51	Apr. 15	0506	-	-	-	-	-	-	-	-	-
			0516	-	-	-	-	-	-	-	-	-
	52	Apr. 15	0550	-	-	-	-	-	-	-	-	-
			0600	-	-	-	-	-	-	-	-	-
BARKLEY SOUND	53	Apr. 16	0137	-	-	-	-	-	-	-	-	-
			0143	-	-	-	-	-	-	-	-	-

Appendix table 4 (cont'd)

Locality	Stn. no.	Date	Time	Pacific herring			Lingcod			Pacific sand lance		
				Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./1000 m^3	Nos./ 1000 m^3/stn.
PACHENA POINT	54	Apr. 15	2335	-	-	-	-	-	-	-	-	-
	55	Apr. 11	1806	-	-	-	10	38.3	38.3	4	15.3	15.3
	56	Apr. 11	2045	-	-		2	10.5	-	2	10.5	
			2100	-	-	-	2	7.7	41.2	2	7.7	6.1
			2115	-	-		17	51.0	-	-	-	
			2130	-	-		16	95.4		1	6.0	
	57	Apr. 11	2200	-	-	-	3	15.3	15.3	-	-	-
	58	Apr. 11	2257	-	-	-	-	-	-	-	-	-
	59	Apr. 11	2400	-	-	-	6	22.6	22.6	3	11.3	11.3
BARKLEY SOUND	60	Apr. 22	0435	-	-	-	-	-	-	-	-	-
	61	Apr. 22	0515	-	-	-	-	-	-	-	-	-

Appendix table 5. Numbers of other larval fish caught in the neuston tows by station for each of the areas surveyed. R/V G.B. REED, April 9-25, 1985.

	PACHENA POINT																											
	Day tows											Night tows																
Station no.	1	2	3	4	5	6	7	8	10	12	13	1	2	3	4	5	6	7	8	9	10	11	12	13	54	55	56	57	58
Irish lord (sp.)	5	3			4		2					5	25	17	11		3	6	86	85	159	13	36	267	171	23	15		2
Sculpin (sp.)	2	5	1	1								45	73	39	18	3	3		11							2	5	6	
Prickleback (sp.)													3	1	1			2	7							1	2		
Blue lanternfish																				44	39	66	21		6		1		
Greenling (sp.)	32	21	21	3	10	1	9	6	16	19	19	6	18	27	8	8	9	3	26	32	32	20	15	10	14	22	364	4	10
Smelt (sp.)	5				2							10	2		1	1			16										
Snailfish (sp.)																1	7	4	9	2				6					
Dwarf wrymouth	10	1			2							9	7	8	10	35	13		61	16					1	51	26	5	
Cabezon																													
Poacher (sp.)																													
Grunnel (sp.)																													
Sand sole																							1						
Lemon sole															1														
Sanddab (sp.)															1														
Gravelliver																	2								1				
Walleye pollock							1																						
Wolf-eel																							1						
Rockfish																													
Unid. larvae	2				2	1						3				1	2		35	1									
Unid. eggs		4	12	14	11	4	16	100	46	39	29	2	5	8	10	20	45	15	452	1337	194	76	128	102	24	66	48	13	

Appendix table 5 (cont'd)

	BARKLEY SOUND									WICKANINNISH BAY							CLAYOQUOT SOUND									
Station no.	14	15	16	17	18	20	21	53	59	22	23	24	25	26	27	28	29	30	31	32	33	35	36	37	38	39
Irish lord (sp.)	2	1	2		3	80	214	181	5	3	3	10	3	19	12	25	14	2	4	14	5		6	102	80	1
Sculpin (sp.)	5			1			1		3	210	16						24	40	13	2		2				
Prickleback (sp.)		1					1	1					1													
Blue lanternfish						68	11			28			39	64	33	11										
Greenling (sp.)	21	9		18	35	87	16	35	1	45	5	63	23	34	47	16	16	20	18	6	69		15	27	17	3
Smelt (sp.)																		12								
Snailfish (sp.)	3	5			3		5		1	1							7	23	13	6						
Dwarf wrymouth	4	3	18	13	20	3			6	2	2	26					16	6	10	37	38	1				
Cabezon				1																						
Poacher (sp.)																			1			1				
Gunnel (sp.)																	12	21								
Sand sole																										
Lemon sole																	2	4								
Sanddab (sp.)																										
Graveldiver																										
Walleye pollock																										
Wolf-eel								2																		
Rockfish																									1	
Unid. larvae							1					1														
Unid. eggs	13	5	98	998	1287	50	158	41	1	3	19	507	51	92	69	33			1	3		8			4	11

Appendix table 5 (cont'd)

	NOOTKA SOUND						KYUQUOT SOUND										Survey total	
	Day tows		Night tows				Day tows					Night tows						
Station no.	41	42	40	41	42	49	43	44	45	46	47	43	44	45	46	47	48	Day	Night
Irish lord (sp.)					12		1					1	3	6	1	2	4	15	1744
Sculpin (sp.)			7	1			2	1	30			91	4	3				42	620
Prickleback (sp.)							1											1	21
Blue lanternfish					19	3									1	3	4	0	461
Greenling (sp.)	53		2	87	14	2	2	3	9		6	13	9	9	5	3	6	230	1424
Smelt (sp.)																		7	42
Snailfish (sp.)													1	1				0	98
Dwarf wrymouth			14	23	2		2					1	1	3	3			15	494
Cabezon																		0	1
Poacher (sp.)																		0	2
Gunnel (sp.)																		0	33
Sand sole									3									3	1
Lemon sole																		0	7
Sanddab (sp.)																		0	1
Graveldiver																		0	3
Walleye pollock																		1	0
Wolf-eel																		0	3
Rockfish																		0	1
Unid. larvae							10	2	39						1			56	45
Unid. eggs	22	10	5	38	88	10	4	3	2		26	2	5		101	31	6	342	6283